本署檔號 OUR REF: (7) in AX(3) to EP2/G/A/124 (pt.5)
來函檔號 YOUR REF: NEX2213-COR-HSD-ENV-040311
電話 TEL. NO.: 2835 1117
圖文傳真 FAX NO.: 2591 0558
電子郵件 E-MAIL:
網址 HOMEPAGE: http://www.epd.gov.hk

Environmental Protection Department
Branch Office
28th Floor, Southorn Centre,
130 Hennessy Road,
Wan Chai, Hong Kong.

環境保護署分處
香港灣仔
軒尼詩道
一百三十號
修頓中心廿八樓

By Post and Fax (fax: 2145 4269)
23 November 2010

MTR Corporation Limited
MTR Headquarters Building,
Telford Plaza, Kowloon Bay,
Kowloon, Hong Kong
(Attn: Mr. Richard KWAN, Manager – Environmental)

Sustainability Development Department	
SP#	
Rec'd On:	23 NOV 2010 Encl ☐
Copy To:	
Clr To:	
File Ref:	

Dear Mr. Kwan,

Shatin to Central Link – Mong Kok East to Hung Hom Section
EIA Study Brief (ESB-192/2008)
Supplementary Sediment Sampling and Testing Plan (Version B) &
Supplementary Contamination Assessment Plan for Works Area in Area 1 (Version B)

I refer to your referenced letter dated 12.11.2010, submitting a Supplementary Sediment Sampling and Testing Plan (Version B) and a Supplementary Contamination Assessment Plan for Works Area in Area 1 (Version B) for our agreement as per Section 3.4.4.2(iii)(a) and Section 3.4.5.4 of the EIA Study Brief No. ESB-192/2008, reproduced below for easy reference.

3.4.4.2(iii)(a) – *Identification and quantification as far as practicable of relevant dredging / excavation, sediment / mud transportation and disposal activities and requirements shall be conducted. Potential dumping ground to be involved shall also be identified. Field investigation, sampling and chemical and biological laboratory tests to characterize the sediment / mud concerned shall be conducted as appropriate. The ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test methods to be used shall be agreed with the Director (with reference to Section 4..4.2(c) of the TM) prior to the commencement of the tests. The categories of sediment / mud which are to be disposed of in accordance with a permit granted under the Dumping at Sea Ordinance (DASO) shall be identified by both chemical and biological tests and their quantities shall be estimated. If the presence of any serious contamination of sediment / mud which requires special treatment / disposal is confirmed, the Applicant shall identify the most*

appropriate treatment and / or disposal arrangement and demonstrate its feasibility;

3.4.5.4 – *During the course of the EIA study, the Applicant shall submit a Contamination Assessment Plan (CAP) to the Director for endorsement prior to conducting the contamination impact assessment of the relevant land or site(s). The CAP shall include proposal with details on representative sampling and analysis required to determine the nature and the extent of the contamination of the relevant land or site(s).*

Please note that our views /comments on the Supplementary Sediment Sampling and Testing Plan (Version B) and the Supplementary Contamination Assessment Plan for Works Area in Area 1 (Version B) for the Shatin to Central Link – Mong Kok East to Hung Hom Section EIA are only provided for the partial fulfillment of the specific requirements for agreement stipulated in the above-mentioned EIA study brief clauses and shall not pre-empt our future decisions to the EIA report approval process under the EIA Ordinance. Our views below shall not absolve your responsibility to fulfill requirements in other statutory legislation.

Subject to the above caveats, I confirm that we have no further comment on the Supplementary Sediment Sampling and Testing Plan (Version B) and the Supplementary Contamination Assessment Plan for Works Area in Area 1 (Version B).

(Desmond CHAN)
Project Engineer (Metro Assessment)
for Director of Environmental Protection

c.c. Internal S(RA)4

AECOM

MTR Corporation Limited

Consultancy Agreement No. NEX/2213

Environmental Impact Assessment (EIA) Study for Shatin to Central Link – Mong Kok East to Hung Hom Section

Supplementary Sediment Sampling and Testing Plan

Nov 2010

	Name	Signature
Prepared & Checked:	Lok Yan	
Reviewed & Approved:	Freeman Cheung	

Version:	B	Date: 11 Nov 2010

AECOM Asia Co. Ltd.
11/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, NT, Hong Kong
Tel: (852) 3105 8686 Fax: (852) 2317 7609 www.aecom.com

TABLE OF CONTENTS

1. INTRODUCTION 1

2. ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES 1

3. ASSESSMENT AREA 1

4. SITE APPRAISAL 2

5. SAMPLING PLAN FOR SITE INVESTIGATION 4

6. INTERPRETATION OF RESULTS 12

7. REPORTING 14

List of Tables

Table 3.1 Works Areas in Area 1 at CRI Not Covered in the Approved CAP and Supplementary CAP for Works Areas in Area 2 and Area 5
Table 4.1 Review of Aerial Photographs for the Assessment Area near CRI under Area 1
Table 4.2 Results of Site Appraisal at the Assessment Area
Table 5.1 Proposed SI at the Assessment Area near CRI under Area 1 for the Historical Railway Maintenance Facility
Table 5.2 Guidelines of Sample Size and Handling for Soil Sample
Table 5.3 Guidelines on Sample Size and Handling for Groundwater Samples
Table 5.4 Parameters, Reporting Limits and Reference Methods for Laboratory
Table 5.5 Laboratory Testing Requirements for TCLP Analysis
Table 6.1 Relevant RBRGs for Soil and Groundwater

List of Figures

NEX2213/C/361/ENS/M50/501 SCL Overall Alignment (With Boundary of SCL – Mong Kok East to Hung Hom Section)
NEX2213/C/361/ENS/M57/701 Latest Alignment and Associated Works Areas
NEX2213/C/361/ENS/M57/702 Proposed Additional Sampling Locations
NEX2213/C/361/ENS/M57/703 Location of Historical Railway Maintenance Facility

List of Appendices

Appendix A Standard Form 3.1 - Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management
Appendix B Chemical Contaminants Listed by Industry Type of "*Australian Standard 4482.1-1997 "Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*"
Appendix C Sampling and Testing Schedule
Appendix D Typical Design of the Groundwater Monitoring Well

1. INTRODUCTION

1.1 A Contamination Assessment Plan (CAP) for Shatin to Central Link (SCL) – Mong Kok East to Hung Hom Section has been prepared and was approved by the Environmental Protection Department (EPD) under the EIA Study Brief (ESB) No. ESB-192/2008 on 8 October 2009 (the "approved CAP"). A subsequent Supplementary CAP was approved on 11 March 2010 for an additional works area in Area 5 at Mong Kok Freight Terminal and rearrangement in part of the site investigation (SI) locations in Area 2 (the "approved Supplementary CAP").

1.2 The alignment at the Chatham Road Interchange (CRI) north of the current Hung Hom Freight Terminal (HFT) has been slightly shifted eastwards since the approval of the aforesaid CAPs, and hence the associated works area, in particular, the proposed cut & cover works area has been modified. "Area 1" in the approved CAP is slightly modified to accommodate the alignment and works changes. The overall project layout and the revised Area 1 based on the latest design are shown in **Figure no. NEX2213/C/361/ENS/M50/501** and **NEX2213/C/361/ENS/M57/701** respectively. Part of Area 1 that has not been covered in the above-mentioned approved CAP and Supplementary CAP for Works Area in Area 2 and Area 5 is therefore assessed in this supplementary CAP to identify any potential land contamination.

1.3 This Supplementary CAP is prepared to summarise the site appraisal findings for any potential land contamination for the revised alignment and the associated works areas at CRI which was previously not assessed, as a supplement to the above-mentioned approved CAP and Supplementary CAP for Works Areas in Area 2 and Area 5. Supplementary Contamination Assessment Report(s) (CARs) and if contamination is found, a Remediation Action Plan (RAP) should be submitted to EPD for endorsement prior to the commencement of construction works at the respective site(s).

2. ENVIRONMENTAL LEGISLATION, STANDARDS AND GUIDELINES

2.1 Assessment of land contamination sources shall be conducted in accordance with the approved CAPs as well as environmental standards and non-statutory guidelines recommended in the approved CAPs which mainly include "*Guidance Note for Contaminated Land Assessment Remediation*" (Guidance Note 1) and "*Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair / Dismantling Workshop*" (Guidance Note 2) issued by EPD. In addition, the Risk Based Remediation Goals (RBRGs) stipulated in the "*Guidance Manual for Use of Risk-based Remediation Goals for Contamination Management*" (The Guidance Manual) issued by EPD shall also be adopted as the criteria for assessing soil and groundwater contamination.

3. ASSESSMENT AREA

3.1 Due to the shift of alignment, part of the works area, in particular, the proposed cut & cover area at CRI (Site ID 1-22) under Area 1 has not been covered in the above-mentioned approved CAP and Supplementary CAP for Works Areas in Area 2 and Area 5 and is therefore assessed in this supplementary CAP to identify any potential land contamination. The details are listed in **Table 3.1** below.

Table 3.1 Works Areas in Area 1 at CRI Not Covered in the Approved CAP and Supplementary CAP for Works Areas in Area 2 and Area 5

Site ID	Location	Brief Description	Figure Reference
1-22	Area from Oi Man Estate extending south-easterly to the Winslow Street Playground. Currently	Tentative works site for cut & cover construction	NEX2213/C/361/ENS/M57/701

Site ID	Location	Brief Description	Figure Reference
	mainly occupied for MTR railway operations.		

3.2 For the section from Winslow Street Playground to HFT under Area 1, the assessment is already been covered in the approved CAP

4. SITE APPRAISAL

Regional Geological Setting

4.1 The regional geological setting of the Assessment Area has been covered in Sections 4.1 through 4.5 in the approved CAP.

4.2 The overall reclamation history covering the Assessment Area can be referred Appendix B of the approved CAP.

Site Inspection and Appraisal

Review of Historical and Current Land Uses

4.3 The assessment involved an initial review of the current and historic land use of all works areas along the construction profile.

4.4 In general, the existing land uses at ground level of the Assessment Area include open storage, low-rise buildings, electricity substation, rest garden, open space and planted areas.

4.5 A review of aerial photographs obtained from the Survey and Mapping Office, Lands Department, was undertaken. In addition to the findings from Sections 4.10 through 4.13 of the approved CAP, further findings from review of the relevant aerial photographs are presented in **Table 4.1**.

4.6 References were also made to the book *Mapping Hong Kong – A Historical Atlas* by Hal Empson, published by the Government Information Services (1992). The Detailed Mapping of Kowloon "Kowloon Peninsula (1947)" surveyed by the Crown Lands and Survey Office of Hong Kong documented in the atlas suggests that the railway maintenance facility as observed from the aerial photographs of 1967 (**Table 4.1**) has existed since 1947.

Table 4.1 Review of Aerial Photographs for the Assessment Area near CRI under Area 1

Year	Height (Feet)	Photograph Reference No.	Notes
1967	--	5415*	View of Kowloon Peninsula. Part of the current HFT was reclaimed; HFT yet to be constructed. The CRI was not constructed; a railway maintenance facility with sheds, railway tracks, locomotive turnaround, and other associated buildings/ structures observed at the CRI area.
1972	1200	1243	View of the CRI area. The railway maintenance facility was completely demolished; the interchange and its immediate north and east were under construction.
1977	1500	18344	View of the CRI area. Construction of the CRI was completed. Areas under and east of the interchange were planted; paved empty space with few containers stored at north of the CRI. A low-rise building on the paved ground with plants and access roads were observed west of the CRI. Camel Secondary School building near Oi Sen Path was constructed.

Year	Height (Feet)	Photograph Reference No.	Notes
1982	4000	46343	Area north of CRI was used as an open storage for suspected construction materials.
1989	4000	A17997	View of Kowloon Peninsula. HFT completely constructed; part of Hung Hom Bay reclaimed. A low-rise building was constructed at the north of the CRI (the current MTR operation storage site). The area west and north of the CRI was reconstructed into open storage areas for containers. The area under and east of the CRI was planted.
1992	3000	CN3098	View of Hung Hom and CRI. Hung Hom Bay reclaimed at large. The area north of the CRI was reconstructed into open storage areas for container-shaped materials; train cars observed parked north and northwest of CRI. The area west of CRI was observed as a site office. The rest garden was observed under the CRI.
1999	4000	CN25189	View of Hung Hom. Hung Hom Bay completely reclaimed; Harbour Place was under construction. The current MTR operation storage site was further constructed. The area under and east to the interchange was planted; the area west of the interchange was partially used as open storage for containers. No major land use change at the CRI since then.
2006	4000	CW71959	View of Hung Hom. The current MTR operation storage site and the CLP substation at Oi Sen Path observed. The area west of the CRI was partially vacant. No major land use change at the CRI since then.

Source: Survey and Mapping Office, Lands Department
* Copy of aerial photograph is given as Figure NEX2213/C/361/ENS/M57/703

Site Inspection

4.7 A site inspection at the proposed cut & cover works area of the Assessment Area near CRI was undertaken on 12 and 13 April 2010, where the historical railway maintenance facility area was located, for identification of potential land contamination due to historical and current land use.

4.8 Results of the site appraisal are summarized in **Table 4.2**.

Table 4.2 Results of Site Appraisal at the Assessment Area

Historical Land Use	Current Land Use (Location)	Further Site Inspection Results Not Cover in the Approved CAP	SI Proposed and Justification	Figure Reference
Railway maintenance facility	Storage site operated by MTR operation	The site was occupied by MTR operation for storage of materials for electricity works e.g. metal pipes and parts for power-transmission equipment) reportedly since 2006. Railway vehicles observed parked on tracks west of this site. The tracks are ballast-based. Previously used as a temporary store for livestock (pigs, cows) transported from the mainland. No bulk chemicals stored, used or disposed onsite. Limited amount (two drums) of lubricating oil stored on secondary containments, and flammables in cabinets under a shelter of the workshop. The entire ground is concrete-paved in good condition, with no observable signs of chemical spillage/ leakage.	No identified potential land contamination due to current land uses. Potential land contamination due to historical railway maintenance facility at the area. No relevant documentation/ information regarding the operation, facilities, or layout were available for review. The areas are located within the works areas where major excavation will be involved. Further SI is needed to confirm the presence of potential land contamination due to historical land use.	NEX2213/C/361/ ENS/M57/703
	Site office occupied by Shun Yuen Construction Co., Ltd.	Located west of the MTR operation storage site. An area approx. 200 m^2 with a site office and inert construction materials (e.g. sand, bricks, and metal fences) stored onsite. The entire ground is concrete-paved in good condition, with no observable signs of chemical spillage/ leakage.		
	Rest garden and planted areas	A rest garden under the CRI with decorative red concrete pillars and plants, grassland, and plants. The ground is paved by tiles.		

Other Relevant Information

4.9 Standard Form Table 3.1 adopted from EPD's Guidance Manual summarising the past, current and future land uses of the potentially contaminating sites of this assessment is provided in **Appendix A**.

5. SAMPLING PLAN FOR SITE INVESTIGATION

Sampling Locations

5.1 Based on the site appraisal results, a total of six boreholes are proposed at the historical railway maintenance facility which overlaps the major excavation works site under the revised alignment construction. The locations of the proposed site investigation (SI) sampling are provided in **Figure no. NEX2213/C/361/ENS/M57/702.**

Sampling Parameters

5.2 Chemicals of concern (COCs) recommended for laboratory analysis at each of the proposed sampling locations are based on the proposed sampling and testing plan from the approved CAP and the further site inspection. Reference is made to Guidance Notes 1 and 2 and the Guidance Manual. Where the desktop review and site investigation observed historical land use of a specific industry type, reference was also made to **Appendix B** "*Chemical Contaminants Listed by Industry Type*" of Australian Standard 4482.1-1997 "*Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*".

5.3 The exact sampling locations of the SI shall be determined onsite and subject to fine adjustments due to site-specific conditions (e.g. headspace, presence of foundations, underground utilities, delivery pipes and services) and approval from relevant operation staff/ engineers.

5.4 If unexpected contamination is observed during the SI (i.e. extensive contamination observed beneath the removed concrete), an increased number of sample locations, sample depths or number of analytes would be recommended to MTR in order to further investigate the extent of contamination present. However, further investigation will only be undertaken upon MTR's written authorisation.

5.5 No documentation/ information regarding the historical railway maintenance facility was available for review. Therefore to be conservative, the following parameters are proposed:

- Total petroleum hydrocarbons (TPH): potential past fuel use for the historical land use;
- All metals[1] for servicing areas and paint workshop at Vehicle Repairing/ Dismantling Workshops, according to the Guidance Manual;
- PCBs: possibly used in past transformer(s)/ generator(s), resistant to degradation;
- Volatile Organic Compounds (VOCs)[2]: past operations and typical contaminants from railway servicing/ maintenance; and
- SVOCs[3]: possibly from incomplete combustion/ solvent use and resistant to degradation.

5.6 The sampling locations, basis for further SI, investigation techniques, proposed number of samples, together with the analytical regime is summarised in **Table 5.1**.

5.7 The sampling and testing plan is provided in **Appendix C**.

[1] The whole list of COCs listed under metals in Appendix IV of Guidance Note 1.

[2] Part of the whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1, except for less persistent/ more volatile Acetone, Methyl tert-Butyl Ether, and Methylene Chloride.

[3] The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.

Table 5.1 Proposed SI at the Assessment Area near CRI under Area 1 for the Historical Railway Maintenance Facility

SI Location	Hotspot Identified at the Area	Proposed SI Method	Proposed Sample Matrix		Parameters to Be Tested	Figure Reference
Historical railway maintenance facility near the CRI	Historical railway maintenance facility Total area of the historical railway maintenance facility: approx. 30,000 m^2; Total area of the railway maintenance facility overlapping the major excavation works areas: approx. 15,000 m^2 A total of six SI locations proposed, i.e. CHT-1 through CHT-6	Borehole	Soil	Soil samples at depths of 0.5, 1.5, 3.0 and 6.0 m bgs; further with 3.0 m intervals to the bottom of excavation or upon encountering bedrock, whichever is shallower if there is excavation works greater than 6.0 m. Visual should be conducted to detect any abnormal colour, smell or other characteristics of the soil during demolition and excavation.	TPH, Metals PCBs, SVOCs, and VOCs (part, see Remarks 2)	NEX2213/C/361/ENS/M57/702
			GW	One GW sample per location if encountered.	TPH, Mercury, PCBs, SVOCs, and VOCs (part, see Remarks 2)	

Remarks:
1. bgs: below ground surface; GW = groundwater
2. VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1, except for Acetone, Methyl tert-Butyl Ether, and Methylene Chloride; SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1.
3. Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
4. Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol* were not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
5. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Soil Sampling Method and Depth of Sampling

5.8 All soil boring / excavation and sampling should be supervised by a land contamination specialist.

5.9 Boreholes should be advanced by means of dry rotary drilling method, i.e. without the use of a flushing medium as far as practicable. For safety reasons, an inspection pit should be excavated to 1.5 m below ground to confirm the absence of subsurface utilities at the proposed borehole location. If necessary, other forms (e.g. ground penetration radar, metal detection) of utility checking methods should be performed to ensure clearance of underground structures. Disturbed soil samples should be collected at 0.5 m and 1.5 m bgs.

5.10 In areas with no excavation works, soil borings should be undertaken to a maximum depth of 6.0 m bgs. For sites where excavations deeper than 6 m are planned, drilling should be undertaken to the specified depth or upon encountering bedrock, whichever is shallower.

5.11 Undisturbed soil samples shall be collected using dedicated sampling tools (e.g. U100/ U76) constructed of stainless steel or other materials considered appropriate. Samples shall be recovered from 0.5 m, 1.5 m, 3 m and 6 m bgs and for deeper excavations at 3 m intervals thereafter. Where suspected signs of contamination are noted, additional samples shall be recovered for laboratory analysis. If there are any spatial and/ or headroom constraints at the proposed borehole(s), trial pit(s) should be considered as an alternative method for collection of soil samples.

5.12 At each sampling location/ depth, sufficient quantity of soil sample (as specified by the laboratory) should be taken. All soil samples should be uniquely labelled and documented on a Chain of Custody form. Backup samples should be retained and stored at 0 - 4 ºC in laboratory. Guidelines on sample size and handling for soil sample are given in **Table 5.2** below.

Table 5.2 Guidelines of Sample Size and Handling for Soil Sample

Matrix			**Soil**		
Container Per Sample			Parameters	Preservation	Temperature
No. of Bottle	Size	Type			
1	1 kg	Amber Glass	Metals, VOCs & SVOCs, TPH, PCBs as specified in Table 5.1	None	0-4°C

Strata Logging

5.13 Strata logging for boreholes should be undertaken during the course of drilling/ digging by a qualified geologist. The logs should include the general stratigraphic description, depth of soil sampling, sample notation and level of groundwater (if encountered). The presence of rocks/ boulders/ cobbles and foreign materials such as metals, wood and plastics should also be recorded.

Free Product and Groundwater Level Measurement

5.14 The thickness of any free product and ground water level if present at sampling locations should be measured with an interface probe. The free product if encountered in sufficient volume should be collected for laboratory analysis to determine the composition.

Groundwater Sampling

5.15 It is proposed to collect groundwater samples if groundwater is encountered in sufficient quantity at the both the trial pit and borehole sampling locations. Collection of groundwater from a trial pit will be undertaken using a disposal bailer or decontaminated bucket, where feasible.

5.16 For each proposed borehole sampling location of which groundwater is encountered, a groundwater well should be installed into the borehole if feasible, following consideration of any engineering

constraints. A typical design of a groundwater sampling well is shown in **Appendix D**, however well construction details shall take into account local conditions.

5.17 Each well should first be developed by removing approximately five well volumes of groundwater to remove silt and drilling fluid residue (if present) from the wells. The wells should then be allowed to stand for 24 hours to permit groundwater conditions to equilibrate. Groundwater levels and thickness of free product layer, if present, should be measured at each well before groundwater samples are taken.

5.18 In the case of more than one groundwater well being installed, the top of the casing of each groundwater well should first be surveyed to a recognised height datum. All groundwater wells should then be gauged at the same time in order to allow mapping of the groundwater flow regime present at the site.

5.19 Prior to groundwater sampling, the monitoring wells should be purged (at least three well volumes) to remove fine-grained materials and to collect freshly refilled representative groundwater samples. Time for each groundwater purging/ recharge should be recorded as well as the estimated groundwater flow.

5.20 After purging, one groundwater sample should first be collected using a decontaminated stainless steel or Teflon bailer and placed into a decontaminated container with the following water quality parameters recorded using a water quality meter; temperature, pH, total dissolved solids, dissolved oxygen, and redox potential.

5.21 One groundwater sample should then be collected at each well using a decontaminated stainless steel bailer and decanted into appropriate sample vials or bottles in a manner that minimizes agitation and volatilization of VOCs from the samples. All samples should be uniquely labelled.

5.22 Trial pits are to be considered as an alternative for sampling due to constraints such as overhead access. Groundwater samples should also be collected at all trial pits if it is encountered in sufficient volume during excavation. Groundwater from trial pits should be collected using a decontaminated bucket. Water quality parameters should also be recorded where the volume of water is great enough (priority should be placed on collecting a groundwater sampling for laboratory analysis).

5.23 Immediately after collection, groundwater samples should be transferred to new, clean, laboratory-supplied glass jars for sample storage/ transport. The sampling glass jars should be of “darken” type. Groundwater samples should be placed in the glass jars with zero headspace and promptly sealed with a septum-lined cap. Immediately following collection, samples should be placed in ice chests, cooled and maintained at a temperature of about 4ºC until delivered to the analytical laboratory.

Sample Size and Decontamination Procedures

5.24 All equipment in contact with the ground or groundwater should be thoroughly decontaminated between each excavation, drilling and sampling event to minimize the potential for cross contamination. The equipment (including drilling pit, digging tools and soil/groundwater samplers) should be decontaminated by steam cleaning or high-pressure hot water jet, then washed by phosphate-free detergent and finally rinsed by distilled/ deionised water.

5.25 Prior to sampling, the laboratory responsible for analysis should be consulted on the particular sample size and preservation procedures that are necessary for each chemical analysis.

5.26 The sample containers should be laboratory cleaned, sealable, water-tight, made of glass or other suitable materials with aluminium or Teflon-lined lids, so that the container surface will not react with the sample or adsorb contaminants. No headspace should be allowed in the containers which contain samples to be analyzed for VOCs, Total Petroleum Hydrocarbon (TPH) fractions or other volatile chemicals.

5.27 The containers should be marked with the sampling location codes and the depths at which the samples were taken. If the contents are hazardous, this should be clearly marked on the container and precautions taken during transport. Samples should be stored at between 0-4 ºC but never frozen. Samples should be delivered to laboratory within 24 hours of the samples being collected and analyzed within the respective retention period for the requested analysis but should not more than 10 days. Guidelines on sample sizes and handling for groundwater samples are given in **Table 5.3** below

Table 5.3 Guidelines on Sample Size and Handling for Groundwater Samples

Matrix			Groundwater		
Container Per Sample			Parameters	Preservation	Temperature
No. of Bottles	Size (mL)	Type			
1	250	Plastic bottle	Metals	HNO_3	0-4°C
1	1000	Amber Glass	PCBs	None	0-4°C
1	1000	Amber Glass	TPH	None	0-4°C
2	40	Brown vial	VOCs & SVOCs	HCl	0-4°C

QA/QC Procedures

5.28 QA/QC samples should be collected with reference to the following frequency criteria where appropriate during the SI Chain of Custody protocol should be adopted.

- 1 duplicate per 20 samples for the full suite analysis;
- 1 equipment blank per 20 samples for the full suite analysis;
- 1 field blank per 20 samples for the full suite analysis; and
- 1 trip blank per trip for the analysis of volatile parameters.

Laboratory Analysis

Laboratory analysis is proposed in order to screen the presence of potential contaminants that are of concern at the Assessment Area. **Table 5.4** listed the parameters, the minimum requirement of the reporting limits and reference methods for the laboratory analyses of soil and groundwater samples for this assessment.

Table 5.4 Parameters, Reporting Limits and Reference Methods for Laboratory

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method
VOCs					
1	Benzene	0.5	USEPA 8260	5	USEPA 8260
2	Bromodichloromethane	0.5		5	
3	2-Butanone	5		50	
4	Chloroform	0.5		5	
5	Ethylbenzene	0.5		5	
6	Styrene	0.5		5	
7	Tetrachloroethene	0.5		5	
8	Toluene	0.5		5	
9	Trichloroethene	0.5		5	

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method
10	Xylenes (Total)	1.5		15	
SVOCs					
11	Acenaphthene	0.5	USEPA 8270	2	USEPA 8270
12	Acenaphthylene	0.5		2	
13	Anthracene	0.5		2	
14	Benzo(a)anthracene	0.5		NA	
15	Benzo(a)pyrene	0.5		NA	
16	Benzo(b)fluoranthene& Benzo(k)fluoranthene	1		4	
17	Benzo(g,h,i)perylene	0.5		NA	
18	bis-(2-Ethylhexyl) phthalate	5		NA	
19	Chrysene	0.5		2	
20	Dibenzo(a,h)anthracen	0.5		NA	
21	Fluoranthene	0.5		2	
22	Fluorene	0.5		2	
23	Hexachlorobenzene	0.2^		4	
24	Indeno(1,2,3-cd)pyrene	0.5		NA	
25	Naphthalene	0.5		2	
26	Phenanthrene	0.5		2	
27	Phenol	0.5		NA	
28	Pyrene	0.5		2	
Metals					
29	Antimony	1	USEPA 6020	NA	USEPA 6020
30	Arsenic	1		NA	
31	Barium	1		NA	
32	Cadmium	0.2		NA	
33	Chromium III	0.5^		NA	
34	Chromium VI	0.5		NA	
35	Cobalt	1		NA	
36	Copper	1		NA	
37	Lead	1		NA	
38	Manganese	1		NA	
39	Mercury	0.05	APHA 3112 Hg: B	0.5	
40	Molybdenum	1	USEPA 6020	NA	
41	Nickel	1		NA	
42	Tin	1		NA	
43	Zinc	1		NA	
Petroleum Carbon Ranges					
44	C6 - C8	5	USEPA 8015	20	USEPA 8015
45	C9 - C16	200		500	
46	C17 - C35	500		500	

Item	Parameter	Soil		Groundwater	
		Reporting Limit (mg/kg) or Otherwise Stated	Reference Method	Reporting Limit (µg/L) or Otherwise Stated	Reference Method
PCBs					
47	PCBs	0.1	USEPA 8270	1	USEPA 8270

Notes:
^: The HOKLAS accreditation of the testing method of the COC is not available in major laboratories in Hong Kong; analyses and will be done with reference to the established protocol of the individual lab.
NA= Not Applicable

5.29 For sampling and laboratory analyses, Chain of Custody procedure should be included as QA/QC procedure.

5.30 All laboratory analysis for soil and groundwater samples should be conducted by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory. All laboratory test methods should be accredited by the HOKLAS or one of its Mutual Recognition Arrangement partners with reference to the Guidance Manual as far as possible, unless otherwise specified in **Table 5.4** or as agreed by EPD. It should be noted that alternative methods or similar reporting limits may be used subject to the laboratory availability and capability. The relevant supporting document of the laboratory to be employed for this study should be given in the future CAP or CAR/ RAP.

5.31 Extra soil samples shall be stored at 0-4 ºC and tested for Toxicity Characteristics Leaching Procedure (TCLP) before submission of the RAP if excavation and landfill disposal is identified as the last resort.

5.32 The criteria are set primarily in terms of TCLP limits shown in **Table 5.5**.

Table 5.5 Laboratory Testing Requirements for TCLP Analysis

Parameter	Test Methods*	Reporting Limit (mg/L)	Landfill Disposal Criteria TCLP Limit (ppm)
TCLP Leachate Preparation allowed by analysis for:			
Antimony (Sb)	USEPA1311 USEPA6020 & USEPA 7112	1	150
Arsenic (As)		1	50
Barium (Ba)		1	1,000
Beryllium (Be)		1	10
Cadmium (Cd)		0.2	10
Chromium (Cr)		1	50
Copper (Cu)		1	250
Lead (Pb)		1	50
Nickel (Ni)		1	250
Selenium (Se)		0.2	1
Silver (Ag)		1	50
Thallium (Ti)		1	50
Tin (Sn)		1	250
Vanadium (V)		1	250
Zinc (Zn)		1	250
Mercury (Hg)		0.2	1

* Equivalent internationally recognised standard methods could also be used.

6. INTERPRETATION OF RESULTS

6.1 With reference to the Guidance Note 1, interpretation of results should make reference to the Guidance Manual. The soil and groundwater samples collected for this study will be compared with Risk-based Remediation Goals (RBRGs) as stipulated in Table 2.1 and Table 2.2 of the Guidance Manual.

6.2 The RBRGs are developed based on a risk assessment approach to suit the local environmental conditions and community needs in Hong Kong. Decisions on contaminated soil and groundwater remediation are based on the nature and extent of the potential risks that are posed to human receptors as a result of exposure to chemicals in the soil and/or groundwater. Four types of land use scenarios are set under RBRGs to reflect the typical physical settings in Hong Kong under which people could be exposed to contaminated soil and groundwater. A description of each land use is as follows.

- Urban residential – Sites located in an urban area where main activities involve habitation by individuals. The typical physical setting is a high rise residential building situated in a housing estate that has amenity facilities such as landscaped yards and children's playgrounds. The receptors are residents who stay indoors most of the time except for a short period each day, during which they are outdoors and have the chance of being in direct contact with soil at landscaping or play areas within the estate.

- Rural residential – Sites located in a rural area where the main activities involve habitation by individuals. These sites typically have village-type houses or low rise residential blocks surrounded by open space. The receptors are rural residents who stay at home and spend some time each day outdoors on activities such as gardening or light sports. The degree of contact with the soil under the rural setting is more than that under the urban setting both in terms of the intensity and frequency of contact.

- Industrial – Any site where activities involve manufacturing, chemical or petrochemical processing, storage of raw materials, transport operations, energy production or transmission, etc. Receptors include those at sites where part of the operation is carried out directly on land and the workers are more likely to be exposed to soil than those working in multi-storey factory buildings.

- Public parks – Receptors include individuals and families who frequent parks and play areas where there is contact with soil present in lawns, walkways, gardens and play areas. Parks are considered to be predominantly hard covered with limited areas of predominantly landscaped soil. Furthermore, public parks are not considered to have buildings present on them.

6.3 In addition to the RBRGs, screening criteria (soil saturation limits, Csat, developed for Non-aqueous Phase Liquid [NAPL] in soil and water solubility limits for NAPL in groundwater) for the more mobile organic chemicals must be considered to determine whether a site requires further action.

6.4 Since this Project involves the construction of a new railway, the Assessment Area is considered to be occupied for industrial purpose in the future and therefore RBRGs for Industrial Land Use will be adopted as the assessment criteria for this land contamination assessment. Relevant soil and groundwater RBRGs for this assessment including the Soil Saturation and Solubility Limits are presented in **Table 6.1**.

Table 6.1 Relevant RBRGs for Soil and Groundwater

Chemical	Soil (mg/kg)		Groundwater (µg/L)	
	RBRGs for Industrial	Soil Saturation Limits	RBRGs for Industrial	Solubility Limits
VOCs				
Benzene	9.21	336	54,000	1,750,000

Chemical	Soil (mg/kg)		Groundwater (µg/L)	
	RBRGs for Industrial	Soil Saturation Limits	RBRGs for Industrial	Solubility Limits
Bromodichloromethane	2.85	1,030	26,200	6,740,000
2-Butanone	10,000	***	10,000,000	***
Chloroform	1.54	1,100	11,300	7,920,000
Ethylbenzene	8,240	138	10,000,000	169,000
Styrene	10,000	497	10,000,000	310,000
Tetrachloroethene	0.777	97.1	2,950	200,000
Toluene	10,000	235	10,000,000	526,000
Trichloroethene	5.68	488	14,200	1,100,000
Xylenes (Total)	1,230	150	1,570,000	175,000
SVOCs				
Acenaphthene	10,000	60.2	10,000,000	4,240
Acenaphthylene	10,000	19.8	10,000,000	3,930
Anthracene	10,000	2.56	10,000,000	43.4
Benzo(a)anthracene	91.8	NA	NA	NA
Benzo(a)pyrene	9.18	NA	NA	NA
Benzo(b)fluoranthene	17.8	NA	7,530	1.5
Benzo(g,h,i)perylene	10,000	NA	NA	NA
Benzo(k)fluoranthene	918	NA	NA	NA
bis-(2-Ethylhexyl)phthalate	91.8	NA	NA	NA
Chrysene	1,140	NA	812,000	1.6
Dibenzo(a,h)anthracene	9.18	NA	NA	NA
Fluoranthene	10,000	NA	10,000,000	206
Fluorene	10,000	54.7	10,000,000	1,980
Hexachlorobenzene	0.582	NA	695	6,200
Indeno(1,2,3-cd)pyrene	91.8	NA	NA	NA
Naphthalene	453	125	862,000	31,000
Phenanthrene	10,000	28	10,000,000	1,000
Phenol	10,000	7,260	NA	NA
Pyrene	10,000	NA	10,000,000	135
Metals				
Antimony	261	NA	NA	NA
Arsenic	196	NA	NA	NA
Barium	10,000	NA	NA	NA
Cadmium	653	NA	NA	NA
Chromium III	10,000	NA	NA	NA
Chromium VI	1,960	NA	NA	NA

Chemical	Soil (mg/kg)		Groundwater (µg/L)	
	RBRGs for Industrial	Soil Saturation Limits	RBRGs for Industrial	Solubility Limits
Cobalt	10,000	NA	NA	NA
Copper	10,000	NA	NA	NA
Lead	2,290	NA	NA	NA
Manganese	10,000	NA	NA	NA
Mercury	38.4	NA	6.79	NA
Molybdenum	3,260	NA	NA	NA
Nickel	10,000	NA	NA	NA
Tin	10,000	NA	NA	NA
Zinc	10,000	NA	NA	NA
PCBs				
PCBs	0.748	0.756	5.11	0.031
Petroleum Carbon Ranges				
C6 - C8	10,000	1,000	1,150,000	5,230
C9 - C16	10,000	3,000	9,980,000	2,800
C17 - C35	10,000	5,000	178,000	2,800

Note: NA - Not Available
*** indicates that the Csat value/ solubility limit exceeds the 'ceiling limit' therefore the RBRG applies

7. REPORTING

7.1 After completion of the SI, a CAR which summarises the detailed methodology of site investigation, assessment criteria, onsite observations and the analytical results from the site investigation works will be prepared for EPD endorsement.

7.2 Should significant contamination be identified within the works areas, a Remediation Action Plan (RAP) will be prepared. The RAP will set out.

i. the objectives of remediation action,

ii. evaluation of different remediation alternatives and,

iii. the design and operation of the proposed remediation method.

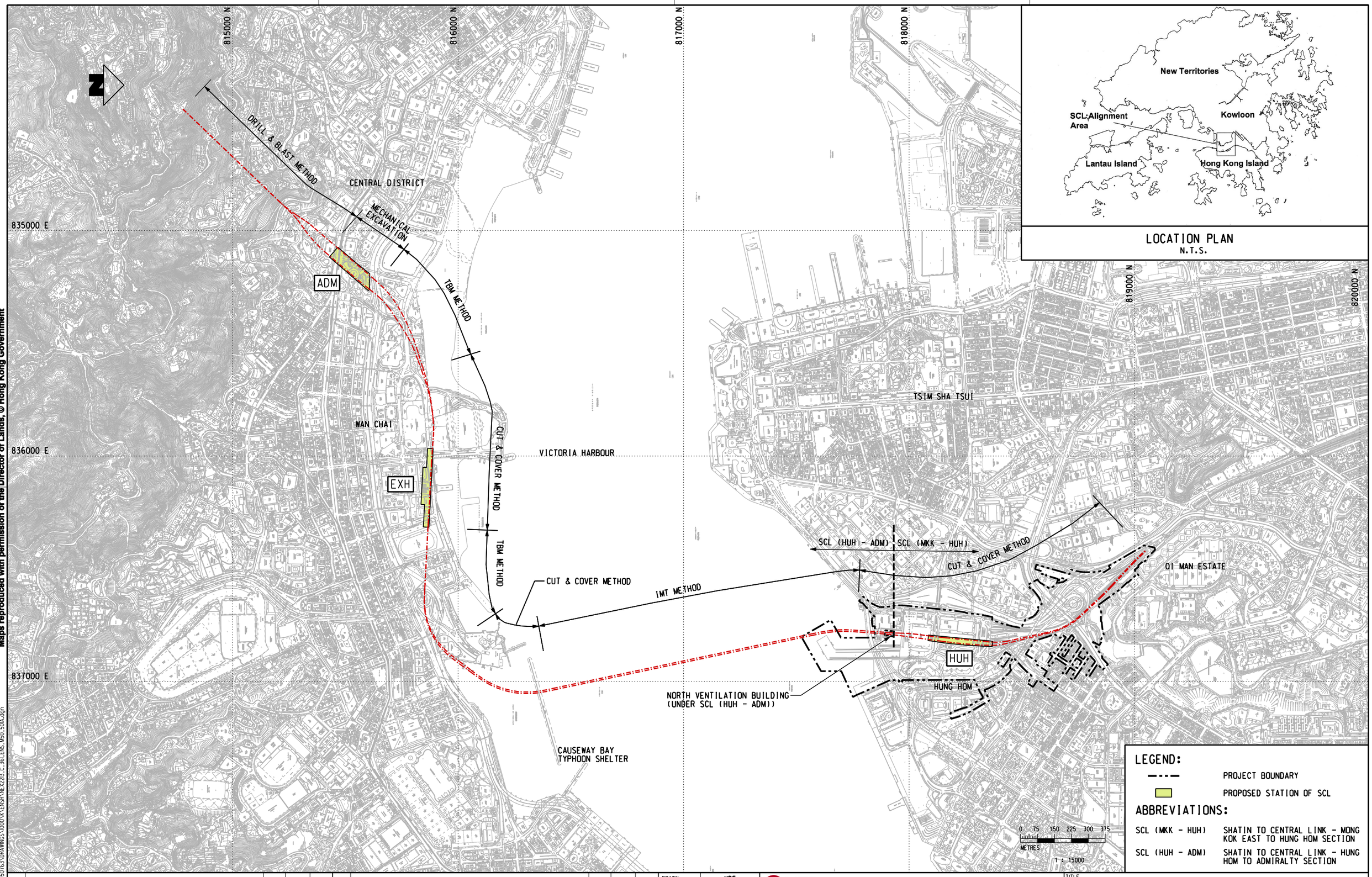
7.3 The RAP will be submitted either separately or together with the CAR under different sections for EPD endorsement. Site cleanup will commence once the CAR/ RAP are vetted and approved by EPD.

7.4 A Remediation Report (RR) for demonstration of adequate clean-up should be prepared and submitted to EPD for endorsement prior to the commencement of any construction/ development works within the site(s)/ area(s). Construction/development works will only be carried out upon obtaining the endorsement of this RR from EPD.

7.5 If contamination is found and landfill disposal is identified as the last resort to remediate the contaminated soil, three impacted soil samples shall be conducted for TCLP test to determine whether they comply with the criteria for landfill disposal in accordance with the Guidance Notes for

Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops before landfill disposal.

Figures



LOCATION PLAN
N.T.S.

LEGEND:

PROJECT BOUNDARY

PROPOSED STATION OF SCL

ABBREVIATIONS:

SCL (MKK - HUH)	SHATIN TO CENTRAL LINK - MONG KOK EAST TO HUNG HOM SECTION
SCL (HUH - ADM)	SHATIN TO CENTRAL LINK - HUNG HOM TO ADMIRALTY SECTION

PLOT DRV: R:\ustrset\MTR\PLOTDRIVER\WINDOWS\A3 COLOUR.pH
MODEL NAME: Default PRINTED BY: ZHANG JC 2010-10-5 9:23:35
FILENAME: M:\PROJECTS\60050763\DRAWINGS\0000\X\ENS\NEX2213_C_361_ENS_M50_501A.dgn

REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	WDF
DESIGNED	---
CHECKED	LCR
APPROVED	---
DATE	14/MAY/2009

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR

AECOM

CADD REF. NEX2213_C_361_ENS_M50_501A.dgn

TITLE

NEX/2213
EIA STUDY FOR SCL (MKK - HUH)
SCL OVERALL ALIGNMENT (WITH BOUNDARY OF SCL - MONG KOK EAST TO HUNG HOM SECTION)

SCALE	FIGURE NO.	REV.
1 : 15000 (A3)	NEX2213/C/361/ENS/M50/501	A

INDICATIVE EXTENT OF RECLAIMED LAND
(SOUTH OF CHATHAM ROAD NORTH INTERCHANGE)
(REFERENCE TO GEOLOGICAL PLAN
NEX2213/C/361/ENS/M58/007 AND HONG KONG GEOLOGICAL
SURVEY MAP (SHEET NO.11)
NEX/2213/C/361/ENS/M58/002)

818400 N

818600 N

819000 N

836600 E

836800 E

1924

SITE OFFICE OCCUPIED BY SHUN YUEN CONSTRUCTION Co., Ltd.

MTR OPERATION STORAGE SITE

AREA 1

SCL- MONG KOK EAST TO HUNG HOM SECTION (PREVIOUS ALIGNMENT)

SCL - MONG KOK EAST TO HUNG HOM SECTION (LATEST ALIGNMENT)

HISTORICAL RAILWAY MAINTENANCE FACILITY

EXISING MTR RAILWAY TRACKS NEAR OI SEN PATH

REST GARDEN UNDER CHATHAM ROAD INTERCHANGE

1-22

HUH

0 10 20 30 40 50
METRES

1 : 2000

LEGEND:

- PROJECT BOUNDARY
- AREA WITH MAJOR EXCAVATION WORKS
- TENTATIVE WORKS AREA
- AREA 1
- 1924 INDICATIVE HISTORICAL SHORELINE (YEAR)
- VENT SHAFTS

PLOT DRV: R:\ustnset\MTRVPLOTDRIVER\WINDOWS\NJ3_COLOUR.pltPRINTED BY: ZHOURH 20NOV10 15:06:01
MODELNAME: Default
FILENAME: M:\projects\600537\03\DRAWINGS\000\X\ENS\NEX2213_C_361_ENS_M57_701C.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	DXL
DESIGNED	---
CHECKED	---
APPROVED	---
DATE	19/AGU/2010

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR

AECOM

CADD REF. NEX2213_C_361_ENS_M57_701C.dgn

TITLE

NEX/2213
EIA STUDY FOR SCL (MKK - HUH)
LATEST ALIGNMENT AND ASSOCIATED WORKS AREA SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN (REVISED ALIGNMENT)

SCALE	FIGURE NO.	REV.
1 : 2000 (A3)	NEX2213/C/361/ENS/M57/701	C

818400 N
818600 N
818800 N
819000 N
836600 E
836800 E

INDICATIVE EXTENT OF RECLAIMED LAND
(SOUTH OF CHATHAM ROAD NORTH INTERCHANGE)
(REFERENCE TO GEOLOGICAL PLAN
NEX2213/C/361/ENS/M58/007 AND HONG KONG GEOLOGICAL
SURVEY MAP (SHEET NO.11)
NEX/2213/C/361/ENS/M58/002)

SCL- MONG KOK EAST
TO HUNG HOM SECTION
(PREVIOUS ALIGNMENT)

HISTORICAL RAILWAY
MAINTENANCE FACILITY

SCL - MONG KOK EAST
TO HUNG HOM SECTION
(LATEST ALIGNMENT)

1924

AREA 1

HUH

CHT-6
CHT-5
CHT-4
CHT-3
CHT-2
CHT-1

CO-ORDINATES FOR ADDITIONAL SAMPLING LOCATIONS		
No.	EASTING	NORTHING
CHT-1	836702.24	818720.76
CHT-2	836755.27	818710.63
CHT-3	836737.06	818751.80
CHT-4	836713.36	818766.10
CHT-5	836680.68	818797.09
CHT-6	836637.16	818787.15

LEGEND:

- PROJECT BOUNDARY
- AREA WITH MAJOR EXCAVATION WORKS
- TENTATIVE WORKS AREA
- AREA 1
- 1924 — INDICATIVE HISTORICAL SHORELINE (YEAR)
- CHT-1 — PROPOSED ADDITIONAL BOREHOLE LOCATIONS FOR LAND CONTAMINATION SI
- VENT SHAFTS

0 10 20 30 40 50
METRES
1 : 2000

PLOT DRV: R:\ustnse1\MTR\PLOTDRIVER\WINDOWS\A3 COLOUR.pltPRINTED BY: ZHOURH 2010-10-4 15:07:29
MODELNAME: Default
FILENAME: M:\projects\60050716\DRAWINGS\000\NA\ENSRVNEX2213_C_361_ENS_M57_702C.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	DXL
DESIGNED	---
CHECKED	---
APPROVED	---
DATE	14/JUL/2010

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR

AECOM

CADD REF. NEX2213_C_361_ENS_M57_702C.dgn

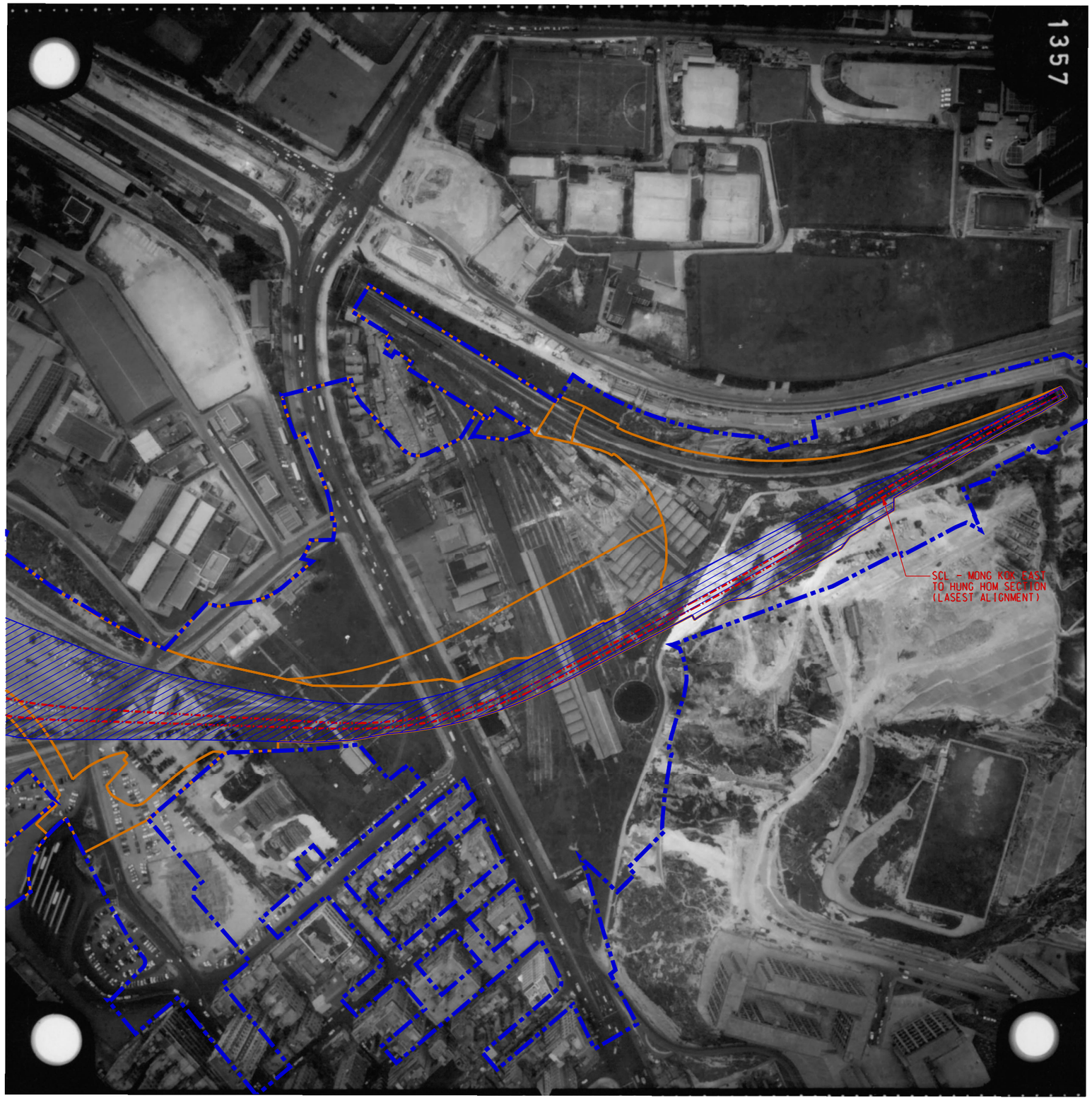
TITLE

NEX/2213
EIA STUDY FOR SCL (MKK - HUH)
PROPOSED ADDITIONAL SAMPLING LOCATONS
SUPPLEMENTARY CONTAMINATION ASSESSMENT
PLAN (REVISED ALIGNMENT)

SCALE 1 : 2000 (A3)

FIGURE NO. NEX2213/C/361/ENS/M57/702

REV. C



0 15 30 45 60 75
METRES

1 : 3000

LEGEND:

- PROJECT BOUNDARY
- TENTATIVE WORKS AREA UNDER NSL WITH MAJOR EXCAVATION / DISTURBANCE OF SOIL
- TENTATIVE WORKS AREA

PLOT DRV: R:\ustnset\MTR\PLOTDRVER\WINDOWS\A3_COLOUR.pltPRINTED BY: ZHOUPH 2010-10-4 14:49:18
MODELNAME: DefaultFILENAME: M:\projects\60050765\DRAWINGS\000\KTENS\NEX2213_C_361_ENS_M57_703B.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	YJP
DESIGNED	---
CHECKED	LCR
APPROVED	---
DATE	16/AGU/2010

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR

AECOM

CADD REF. NEX2213_C_361_ENS_M57_703B.dgn

TITLE

NEX/2213
EIA STUDY FOR SCL (MKK - HUH)
LOCATION OF HISTORICAL RAILWAY MAINTENANCE FACILITY SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN (REVISED ALIGNMENT)

SCALE	FIGURE NO.	REV.
1 : 3000 (A3)	NEX2213/C/361/ENS/M57/703	B

Appendix A

Standard Form 3.1 - Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Appendix A Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Property Name: SCL Alternative Alignment

Current Use

ID	Type of facility/business	On-site property land use	Date began[1]	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property	Off-site property affected? ___ Yes ____ No
1-22	Open storage for inert materials	Industrial	2006	MTR operation for storage of materials for electricity works (e.g. metal pipes and parts only for power-transmission equipment	MTR	1000 m^2	No
	Site office	Industrial	-	Shun Yuen Construction Co., Ltd.	Shun Yuen Construction Co., Ltd.	200 m^2	No
	Rest garden	Public Parks	1989	Rest garden for public recreation	-	150 m^2	No

[1] Specify the approximate year in which the current use of the on-site property began

Appendix A Standard Form 3.1- Summary of On-Site Land Use Adopted from Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

Past Use

Are past uses different from current uses? __✓__ Yes ____ No If Yes, complete this section.

Complete this table with each different operation, use or status of the on-site property. Include all operations back to pre-commercial or pre-industrial time if this information is necessary to characterize the site. Specify the status of the property at each stage, including times it may have been vacant. Start with the most recent use and list in chronological order backwards through time.

ID	Type of facility/business	On-site property land use	Date began[2]	Date ended[3]	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property (if different from current size)	Off-site property affected? ___ Yes ____ No
1-22	Railway maintenance facility	Industrial	Before 1947	1972	Facilities for railway maintenance, including the locomotive turnaround and maintenance shed	-	-	No

Future Use

Will future uses be different from current uses? _✓_ Yes ____No If Yes, complete this section.

ID	Type of facility/business	On-site property land use	Description of business process/primary products	Owner or Occupier	Approximately size of on-site property
1-22	Railway	Industrial	Railway operations	MTR	1350 m^2

[2] Specify the approximate year in which the past use of the on-site property began
[3] Specify the approximate year in which the past use of the on-site property ended

Appendix B

Chemical Contaminants Listed by Industry Type of "*Australian Standard 4482.1-1997 "Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*"

APPENDIX I
CHEMICAL CONTAMINANTS LISTED BY INDUSTRY TYPE

Table I1 lists chemicals used in various industries. The exact nature of the contaminant associated with the particular industry is site specific, depending on the standard of management and the practice and safety procedures employed at each site.

This is not an all inclusive list of industries using chemicals and some of the chemicals mentioned are no longer used (e.g. carbon tetrachloride in the dry cleaning industry).

TABLE I1
LIST OF INDUSTRIES

Industry	Type of chemical	Associated chemicals
Agricultural/horticultural activities		See fertilizer, insecticides, fungicides, herbicides under chemicals manufacture and use
Airports	Hydrocarbons Metals	Aviation fuels Particularly aluminium, magnesium, chromium
Asbestos production and disposal		Asbestos
Battery manufacture and recycling	Metals Acids	Lead, manganese, zinc, cadmium, nickel, cobalt, mercury, silver, antimony Sulfuric acid
Breweries/distilleries	Alcohol	Ethanol, methanol, esters

(*continued*)

TABLE 11 (*continued*)

Industry	Type of chemical	Associated chemicals
Chemicals manufacture and use	Acid/alkali	Mercury (chlor/alkali), sulfuric, hydrochloric and nitric acids, sodium and calcium hydroxides
	Adhesives/resins	Polyvinyl acetate, phenols, formaldehyde, acrylates, phthalates
	Dyes	Chromium, titanium, cobalt, sulfur and nitrogen organic compounds, sulfates, solvents
	Explosives	Acetone, nitric acid, ammonium nitrate, pentachlorophenol, ammonia, sulfuric acid, nitroglycerine, calcium cyanamide, lead, ethylene glycol, methanol, copper, aluminium, bis(2-ethylhexyl) adipate, dibutyl phthalate, sodium hydroxide, mercury, silver
	Fertilizer	Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium
	Flocculants	Aluminium
	Foam production	Urethane, formaldehyde, styrene
	Fungicides	Carbamates, copper sulfate, copper chloride, sulfur, chromium, zinc
	Herbicides	Ammonium thiocyanate, carbamates, organochlorines, organophosphates, arsenic, mercury, triazines
	Paints	
	Heavy metals	Arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc
		Titanium
	Solvents	Toluene oils natural (e.g. pine oil) or synthetic
	Pesticides	
	Active ingredients	Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids
	Solvents	Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents
	Pharmaceutical	
	Solvents	Acetone, cyclohexane, methylene chloride, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol, pyridine methyl ethyl ketone, methyl isobutyl ketone, tetrahydrofuran
	Photography	Hydroquinone, sodium carbonate, sodium sulfite, potassium bromide, monomethyl para-aminophenol sulfate, ferricyanide, chromium, silver, thiocyanate, ammonium compounds, sulfur compounds, phosphate, phenylene diamine, ethyl alcohol, thiosulfates, formaldehyde
	Plastics	Sulfates, carbonates, cadmium, solvents, acrylates, phthalates, styrene
	Rubber	Carbon black
	Soap/detergent	
	General	Potassium compounds, phosphates, ammonia, alcohols, esters, sodium hydroxide, surfactants (sodium lauryl sulfate), silicate compounds
	Acids	Sulfuric acid and stearic acid
	Oils	Palm, coconut, pine, teatree
	Solvents	
	General	Ammonia
	Hydrocarbons	e.g. BTEX (benzene, toluene, ethylbenzene, xylene)
	Chlorinated organics	e.g., trichloroethane, carbon tetrachloride, methylene chloride

(*continued*)

TABLE 11 (*continued*)

Industry	Type of chemical	Associated chemicals
Defence works		See explosives under chemicals manufacture and use, foundries, engine works, service stations
Drum reconditioning		See chemicals manufacture and use
Dry cleaning		Trichlorethylene and 1, 1, 1 - trichloroethane Carbon tetrachloride Perchlorethylene
Electrical		PCBs (transformers and capacitors), solvents, tin, lead, copper, mercury
Engine works	Hydrocarbons Metals Solvents Acids/alkalis Refrigerants Antifreeze	 Chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons Ethylene glycol, nitrates, phosphates, silicates
Foundries	Metals Acids	Particularly aluminium, manganese, iron, copper, nickel, chromium zinc, cadmium and lead and oxides, chlorides, fluorides and sulfates of these metals Sulfuric and phosphoric Phenolics and amines Coke/graphite dust
Gas works	Inorganics Organics	Ammonia, cyanide, nitrate, sulfide, thiocyanate Aluminium, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc BTEX, phenolics, PAHs and coke
Iron and steel works		BTEX, phenolics, PAHs, Metals and oxides of iron, nickel, copper, chromium, magnesium manganese and graphite
Landfill sites		Alkanes and ammonia, sulfides, heavy metals, organic acids
Marinas	Antifouling paints	See engine works, electroplating metals under metal treatments Copper, tributyltin (TBT)
Metal treatments	Electroplating Metals Acids General Liquid carburizing baths	Nickel, chromium, zinc, aluminium, copper, lead, cadmium, tin Sulfuric, hydrochloric, nitric, phosphoric Sodium hydroxide, 1,1,1-trichloroethane, tetrachloroethylene, toluene, ethylene glycol, cyanide compounds Sodium, cyanide, barium, chloride, potassium chloride, sodium chloride, sodium carbonate, sodium cyanate
Mining and extractive industries		Arsenic, mercury and cyanides and also refer to explosives. Aluminium, arsenic, copper, chromium, cobalt, lead, manganese, nickel, selenium, zinc and radio-radionuclides. The list of heavy metals should be decided according to the composition of the deposit and known impurities

(*continued*)

TABLE I1 (*continued*)

Industry	Type of chemical	Associated chemicals
Power stations		Asbestos, PCBs, fly ash metals, water treatment chemicals
Printing shops		Acids, alkalis, solvents, chromium (see photography)
Railway yards		Hydrocarbons, arsenic, phenolics (creosote), heavy metals, nitrates and ammonia
Scrap yards		Hydrocarbons, metals, solvents
Service stations and fuel storage facilities		Aliphatic hydrocarbons BTEX (i.e., benzene, toluene, ethylbenzene, xylene) PAHs Phenols Lead
Sheep and cattle dips		Arsenic, organochlorines and organophosphates, carbamates, and synthetic pyrethoids
Smelting and refining		Metals and the fluorides, chlorides and oxides of copper, tin, silver, gold, selenium, lead, aluminium
Tanning and associated trades	Metals General	Chromium, manganese, aluminium Ammonium sulfate, ammonia, ammonium nitrate, arsenic phenolics, formaldehyde, sulfide, tannic acid
Water and sewerage treatment plant	Metals	Aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, fluoride, lime and zinc
Wood preservation	Metals General	Chromium, copper, arsenic Naphthalene, ammonia, pentachlorophenol, dibenzofuran, anthracene, biphenyl, ammonium sulfate, quinoline, boron, creosote, organochlorine pesticides

Appendix C

Sampling and Testing Schedule

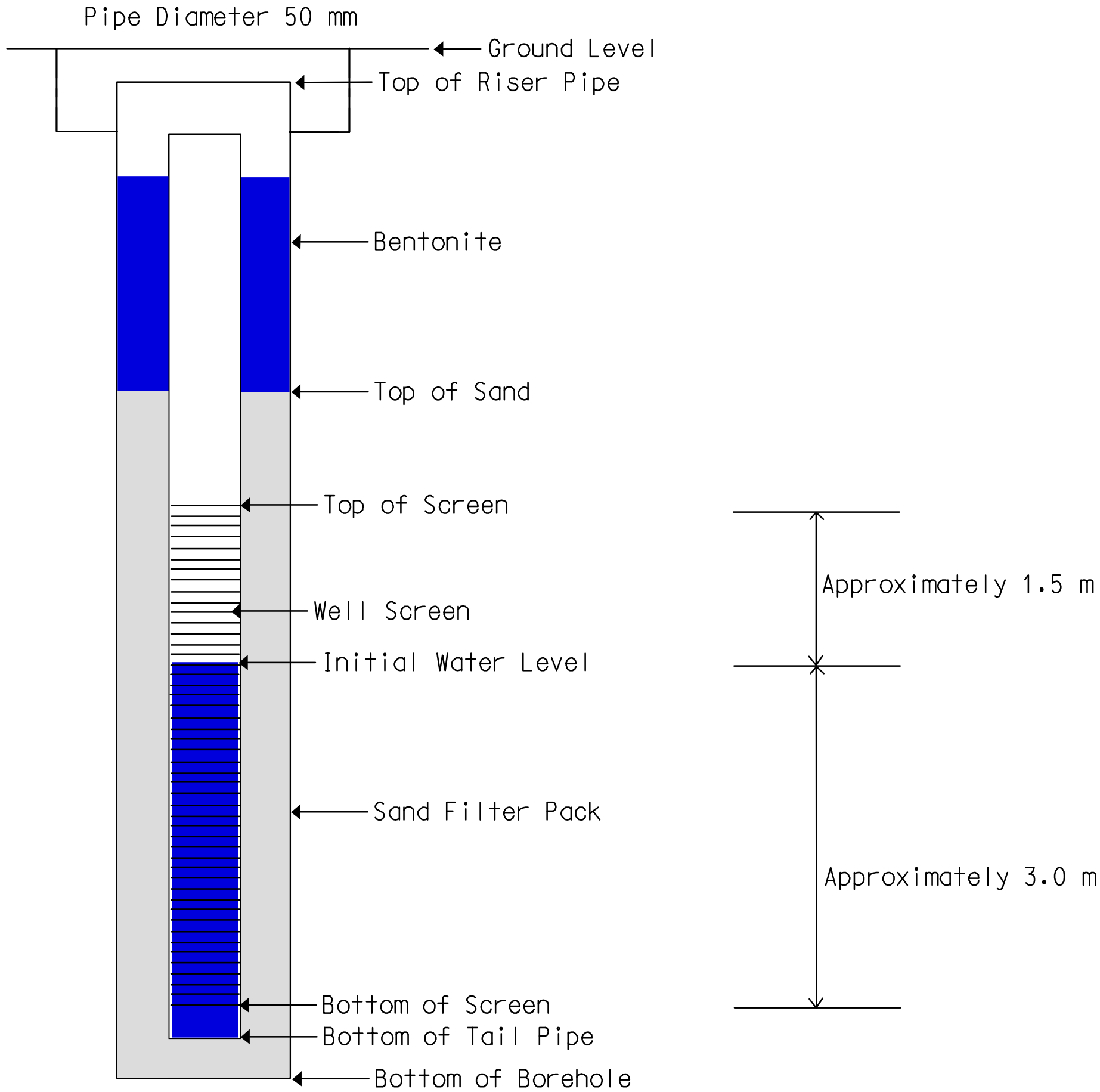
Locations and Testing Parameters of Soil and Groundwater Sampling for the Assessment Area

Sample ID	Metals	TPH	VOCs*	SVOCs*	PCBs
CHT-1 through CHT-6 (soil)	✓	✓	✓	✓	✓
CHT-1 through CHT-6 (groundwater)**	✓	✓	✓	✓	✓

Notes:
1. *VOCs = The whole list of COCs listed under VOCs in Appendix IV of Guidance Note 1, ***except for Acetone, Methyl tert-Butyl Ether, and Methylene Chloride***;
2. SVOCs = The whole list of COCs listed under SVOCs in Appendix IV of Guidance Note 1. Since the RBRGs value of *Benzo(a)anthracene Benzo(a)pyrene, Benzo(g,h,i)perylene Benzo(k)fluoranthene bis-(2-Ethylhexyl)phthalate Dibenzo(a,h)anthracene Indeno(1,2,3-cd)pyrene* and *Phenol are* not available for groundwater, the captioned chemicals parameters would not be tested in the groundwater sample.
3. Metals - The whole list of COCs listed under Metals in Appendix IV of Guidance Note 1.
4. If there are any spatial and headroom constraints for the proposed sampling locations, trial pit(s) should be considered as an alternative to collect soil samples. The maximum depth of trial pits should be at least 2m - 3m bgs subject to site conditions.

Appendix D

Typical Design of the Groundwater Monitoring Well



REV	DESCRIPTION	BY	DATE	APPROVED

REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	VTHL
DESIGNED	
CHECKED	
APPROVED	
DATE	08/Jan/2010

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR

AECOM

CADD REF.

TITLE

NEX/2213

EIA STUDY FOR SCL (MKK – HUH)

TYPICAL DESIGN OF THE GROUNDWATER MONITORING WELL SUPPLEMENTARY CONTAMINATION ASSESSMENT PLAN

SCALE	DRAWING NO.	REV.
N.T.S.		